



US009342846B2

(12) **United States Patent**  
**Maddali et al.**

(10) **Patent No.:** **US 9,342,846 B2**  
(45) **Date of Patent:** **May 17, 2016**

(54) **RECONCILING DETAILED TRANSACTION FEEDBACK**

(71) Applicant: **eBay Inc.**, San Jose, CA (US)

(72) Inventors: **Lakshman Shyam Sundar Maddali**,  
Fremont, CA (US); **Avani Goel Sharma**,  
San Jose, CA (US)

(73) Assignee: **eBay Inc.**, San Jose, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 319 days.

(21) Appl. No.: **13/861,556**

(22) Filed: **Apr. 12, 2013**

(65) **Prior Publication Data**

US 2014/0309987 A1 Oct. 16, 2014

(51) **Int. Cl.**  
**G06Q 30/02** (2012.01)  
**G06F 17/27** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **G06Q 30/0282** (2013.01); **G06F 17/2785**  
(2013.01)

(58) **Field of Classification Search**  
CPC .. G06Q 30/0282; G06F 17/27; G06F 17/2785  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2002/0016798	A1 *	2/2002	Sakai et al.	707/517
2004/0128224	A1 *	7/2004	Dabney et al.	705/37
2006/0116862	A1 *	6/2006	Carrier et al.	704/1
2006/0271286	A1 *	11/2006	Rosenberg	701/211
2007/0005340	A1 *	1/2007	Goutte et al.	704/9
2007/0005586	A1 *	1/2007	Shaefer et al.	707/5

2007/0239553	A1 *	10/2007	Lin et al.	705/26
2008/0183648	A1 *	7/2008	Goldberg et al.	706/13
2008/0249764	A1 *	10/2008	Huang et al.	704/9
2008/0288255	A1 *	11/2008	Carin et al.	704/256.1
2008/0313038	A1 *	12/2008	Wajihuddin	705/14
2009/0222395	A1 *	9/2009	Light et al.	706/47
2010/0150393	A1 *	6/2010	Ni et al.	382/100
2010/0208093	A1 *	8/2010	Lee et al.	348/222.1
2011/0040790	A1 *	2/2011	Tateno	707/780
2011/0078017	A1 *	3/2011	Lam et al.	705/14.45
2011/0078167	A1 *	3/2011	Sundaresan et al.	707/765
2011/0087484	A1 *	4/2011	Lee	704/9
2011/0106672	A1 *	5/2011	Stinson	705/30
2011/0208522	A1 *	8/2011	Pereg et al.	704/235
2012/0101808	A1 *	4/2012	Duong-Van	704/9
2013/0173254	A1 *	7/2013	Alemi	704/9
2013/0173616	A1 *	7/2013	Fekri et al.	707/736
2013/0268262	A1 *	10/2013	Moilanen et al.	704/9

(Continued)

#### OTHER PUBLICATIONS

Liu, Bing, "Sentiment Analysis and Opinion Mining", Morgan & Claypool Publishers, (Apr. 22, 2012), 1-168.

(Continued)

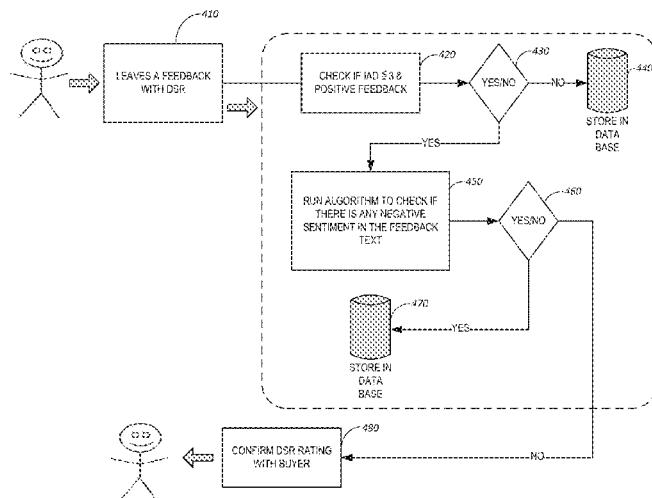
Primary Examiner — Eric Yen

(74) Attorney, Agent, or Firm — Schwegman Lundberg & Woessner, P.A.

#### (57) ABSTRACT

Reconciling detailed transaction feedback by detecting a rating of a transaction, where the rating indicates a negative experience, mining the sentiment of words in feedback text that is included with or as part of the rating to detect whether the words indicate positive sentiment or negative sentiment, responsive to determining that the words in the feedback text indicate that the feedback text connotes a positive sentiment, adjusting the rating of the transaction. The mining may include testing words in the feedback text to detect whether the words indicate positive sentiment or negative sentiment by calculating a sentiment score.

**18 Claims, 10 Drawing Sheets**



(56)

**References Cited****U.S. PATENT DOCUMENTS**

2013/0346067	A1 *	12/2013	Bhatt	704/9
2014/0114648	A1 *	4/2014	Eggink et al.	704/9
2014/0278363	A1 *	9/2014	Allen et al.	704/9
2014/0278365	A1 *	9/2014	Zhang et al.	704/9

**OTHER PUBLICATIONS**

- Liu, Bing, "Sentiment Analysis and Opinion Mining-AAAI-2011 Tutorial", AAAI-2011, The main content is from Chapter 11 of Web Data Mining: Exploring Hyperlinks, Contents and Usage Data. Second Edition, Springer, Jul. 2011., (Aug. 8, 2011), 1-198.
- "Identifying Noun Product Features that Imply Opinions", ACL-2011 (short paper), Portland, Oregon, USA (Jun. 2011), 6 pgs.
- Chen, Zhiyuan, et al., "Aspect Extraction with Automated Prior Knowledge Learning", Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (ACL 2014), (Jun. 2014), 12 pgs.
- Chen, Zhiyuan, et al., "Exploiting Domain Knowledge in Aspect Extraction.", Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP-2013), (Oct. 2013), 13 pgs.
- Chen, Zhiyuan, "Identifying Intention Posts in Discussion Forums", Proceedings of the 2013 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT-2013), Atlanta, USA., (Jun. 2013), 1041-1050.
- Chen, Zhiyuan, et al., "Lifelong Learning for Sentiment Classification", Proceedings of the 53rd Annual Meeting of the Association for Computational Linguistics, (Jul. 2015), 750-756.
- Ding, Xiaowen, et al., "A Holistic Lexicon-Based Approach to Opinion Mining", Proceedings of First ACM International Conference on Web Search and Data Mining (WSDM-2008), Stanford University, Stanford, California, USA, (Feb. 2008), 9 pgs.
- Ding, Xiaowen, et al., "Entity Discovery and Assignment for Opinion Mining", Proceedings of ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-09, industrial track), Paris., (2009), 9 pgs.
- Ding, Xiaowen, et al., "Resolving Object and Attribute Coreference in Opinion Mining", Proceedings of the 23rd International Conference on Computational Linguistics (COLING-2010), Beijing, China., (Aug. 2010), 9 pgs.
- Ding, Xiaowen, et al., "The Utility of Linguistic Rules in Opinion Mining", SIGIR-2007 (poster paper), Amsterdam, (Jul. 2007), 2 pgs.
- Fei, Geli, et al., "Exploiting Burstiness in Reviews for Review Spammer Detection", Proceedings of the International AAAI Conference on Weblogs and Social Media (ICWSM-2013), Boston, USA, (Jul. 2013), 10 pgs.
- Ganapathibhotla, Murthy, et al., "Mining Opinions in Comparative Sentences", Proceedings of the 22nd International Conference on Computational Linguistics (Coling-2008), Manchester, (Aug. 2008), 8 pgs.
- Hu, Mingqing, et al., "Mining and Summarizing Customer Reviews", Proceedings of Nineteenth National Conference on Artificial Intelligence (AAAI-2004), San Jose, USA, (Jul. 2004), 10 pgs.
- Hu, Mingqing, et al., "Mining Opinion Features in Customer Reviews", Proceedings of Nineteenth National Conference on Artificial Intelligence, (2004), 6 pgs.
- Jindal, Nitin, et al., "Finding Unusual Review Patterns Using Unexpected Rules", 19th ACM International Conference on Information and Knowledge Management (CIKM-2010, short paper), Toronto, Canada, (Oct. 2010), 4 pgs.
- Jindal, Nitin, et al., "Identifying Comparative Sentences in Text Documents", Proceedings of the 29th Annual International ACM SIGIR Conference on Research & Development on Information Retrieval (SIGIR-06), Seattle, (2006), 8 pgs.
- Jindal, Nitin, et al., "Mining Comparative Sentences and Relations", Proceedings of 21st National Conference on Artificial Intelligence, Boston, Massachusetts, USA, (Jul. 2006), 6 pgs.
- Jindal, Nitin, "Opinion Spam and Analysis", Proceedings of First ACM International Conference on Web Search and Data Mining (WSDM-2008), Stanford University, Stanford, California, USA, (Feb. 2008), 11 pgs.
- Jindal, Nitin, et al., "Review Spam Detection", Proceedings of WWW-2007 (poster paper), Banff, Canada, (May 2007), 118-1190.
- Li, Huayi, et al., "Analyzing and Detecting Opinion Spam on a Large-scale Dataset via Temporal and Spatial Patterns", Short paper at ICWSM-2015, (2015), 634-637.
- Li, Huayi, et al., "Detecting Campaign Promoters on Twitter using Markov Random Fields", Proceedings of IEEE International Conference on Data Mining (ICDM-2014), (Dec. 2014), 10 pgs.
- Li, Huayi, et al., "Extracting Verb Expressions Implying Negative Opinions.", Proceedings of Twenty-Ninth AAAI Conference on Artificial Intelligence (AAAI-15), (2015), 7 pgs.
- Li, Huayi, et al., "Spotting Fake Reviews via Collective Positive-Unlabeled Learning", Proceedings of IEEE International Conference on Data Mining (ICDM-2014, short paper), (Dec. 2014), 6 pgs.
- Lim, Ee-Peng, "Detecting Product Review Spammers using Rating Behaviors", Proceedings of IEEE International Conference on Data Mining (ICDM-2014), (Dec. 2014), 10 pgs.
- Liu, Bing, "Opinion Mining", Invited contribution to Encyclopedia of Database Systems, (2008), 7 pgs.
- Liu, Bing, et al., "Opinion Observer: Analyzing and Comparing Opinions on the Web", Proceedings of the 14th international World Wide Web conference (WWW-2005), in Chiba, Japan., (May 2005), 10 pgs.
- Liu, Bing, "Sentiment Analysis and Opinion Mining", Morgan & Claypool Publishers, (May 2012), 168 pgs.
- Liu, Bing, "Sentiment Analysis and Subjectivity", Invited Chapter for the Handbook of Natural Language Processing, Second Edition., (Mar. 2010), 38 pgs.
- Liu, Bing, "Sentiment Analysis: A Multi-Faceted Problem", Invited paper, IEEE Intelligent Systems, 25(3), (2010), 5 pgs.
- Liu, Qian, et al., "A Logic Programming Approach to Aspect Extraction in Opinion Mining", Proceedings of IEEE/WIC/ACM International Conference on Web Intelligence (WI-2013), (2013), 276-283.
- Liu, Qian, "Automated Rule Selection for Aspect Extraction in Opinion Mining", Proceedings of International Joint Conference on Artificial Intelligence (IJCAI-2015), (Jul. 2015), 1291-1297.
- Mukherjee, Arjun, et al., "Aspect Extraction through Semi-Supervised Modeling", Proceedings of 50th Annual Meeting of Association for Computational Linguistics (ACL-2012) Jeju, Republic of Korea., (Jul. 2012), 10 pgs.
- Mukherjee, Arjun, et al., "Detecting Group Review Spam", WWW-2011 poster paper, (2011), 2 pgs.
- Mukherjee, Arjun, "Discovering User Interactions in Ideological Discussions", Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics (ACL-2013), Aug. 4-9, 2013, Sofia, Bulgaria., (Aug. 2013), 671-681.
- Mukherjee, Arjun, et al., "Improving Gender Classification of Blog Authors", Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP-10), MIT, Massachusetts, USA., (Oct. 2010), 11 pgs.
- Mukherjee, Arjun, et al., "Mining Contentions from Discussions and Debates", Proceedings of SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2012), Beijing, China., (Aug. 2012), 9 pgs.
- Mukherjee, Arjun, et al., "Modeling Review Comments", Proceedings of 50th Annual Meeting of Association for Computational Linguistics (ACL-2012) Jeju, Republic of Korea., (Jul. 2012), 10 pgs.
- Mukherjee, Arjun, "Public Dialogue: Analysis of Tolerance in Online Discussions", Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics (ACL-2013), (Aug. 2013), 11 pgs.
- Mukherjee, Arjun, et al., "Spotting Fake Reviewer Groups in Consumer Reviews", WWW 2012, (2012), 1-10.
- Mukherjee, Arjun, et al., "Spotting Opinion Spammers using Behavioral Footprints", Proceedings of SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2013) Chicago USA, (Aug. 2013), 9 pgs.

(56)

**References Cited**

## OTHER PUBLICATIONS

Mukherjee, Arjun, et al., "What Yelp Fake Review Filter Might Be Doing?", Proceedings of the International AAAI Conference on Weblogs and Social Media (ICWSM-2013) Boston, USA, (Jul. 2013), 10 pgs.

Narayanan, Ramanathan, et al., "Sentiment Analysis of Conditional Sentences", Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP-09). Singapore, (Aug. 2009), 10 pgs.

Qian, Tieyun, et al., "Identifying Multiple Userids of the Same Author", Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP-2013), Seattle, USA, (Oct. 2013), 12 pgs.

Qiu, Guang, et al., "Expanding Domain Sentiment Lexicon through Double Propagation", Proceedings of the 21st International Joint Conference on Artificial Intelligence (IJCAI-09), Pasadena, California, USA, (Jul. 2009), 6 pgs.

Qui, Guang, "Opinion Word Expansion and Target Extraction through Double Propagation", Computational Linguistics, vol. 37, No. 1: 9-27, (Mar. 2011), 20 pgs.

Si, Jianfeng, et al., "Exploiting Topic based Twitter Sentiment for Stock Prediction", Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics (ACL-2013, short paper), (Aug. 2013), 6 pgs.

Wang, Guan, "Identify Online Store Review Spammers via Social Review Graph", ACM Transactions on Intelligent Systems and Technology, accepted for publication, (2011), 61:1-61:21.

Wang, Guan, et al., "Review Graph based Online Store Review Spammer Detection", ICDM, (2011), 6 pgs.

Wang, Jing, et al., "Diversionary comments under blog posts", ACM Transactions on the Web (TWEB), (2015), 1789-1793.

Zhai, Zhongwu, et al., "Clustering Product Features for Opinion Mining", Proceedings of Fourth ACM International Conference on Web Search and Data Mining (WSDM-2011) Hong Kong, China, (Feb. 2011), 8 pgs.

Zhai, Zhongwu, et al., "Constrained LDA for Grouping Product Features in Opinion Mining", Proceedings of PAKDD-2011, Shenzhen, China, 2011. (Best Paper Award), (2011), 12 pgs.

Zhai, Zhongwu, et al., "Grouping Product Features Using Semi-Supervised Learning with Soft-Constraints", Proceedings of the 23rd International Conference on Computational Linguistics Beijing, China, (Aug. 2010), 10 pgs.

Zhai, Zhongwu, et al., "Identifying Evaluative Sentences in Online Discussions", Proceedings of AAAI-2011, San Francisco, USA (Aug. 2011), 6 pgs.

Zhang, Lei, et al., "Combining Lexicon-based and Learning-based Methods for Twitter Sentiment Analysis", HP Labs Technical Report, (2011), 8 pgs.

Zhang, Lei, et al., "Entity Set Expansion in Opinion Documents", Proceedings of Fourth ACM International Conference on Web Search and Data Mining—Hong Kong, China., (Feb. 2011), 9 pgs.

Zhang, Lei, et al., "Extracting and Ranking Product Features in Opinion Documents", Proceedings of the 23rd International Conference on Computational Linguistics (COLING-2010), Beijing, China., (Aug. 2010), 9 pgs.

Zhang, Lei, et al., "Extracting Resource Terms for Sentiment Analysis", Proceedings of the 5th International Joint Conference on Natural Language Processing (IJCNLP-2011), Chiang Mai, Thailand, (Nov. 2011), 1171-1179.

\* cited by examiner

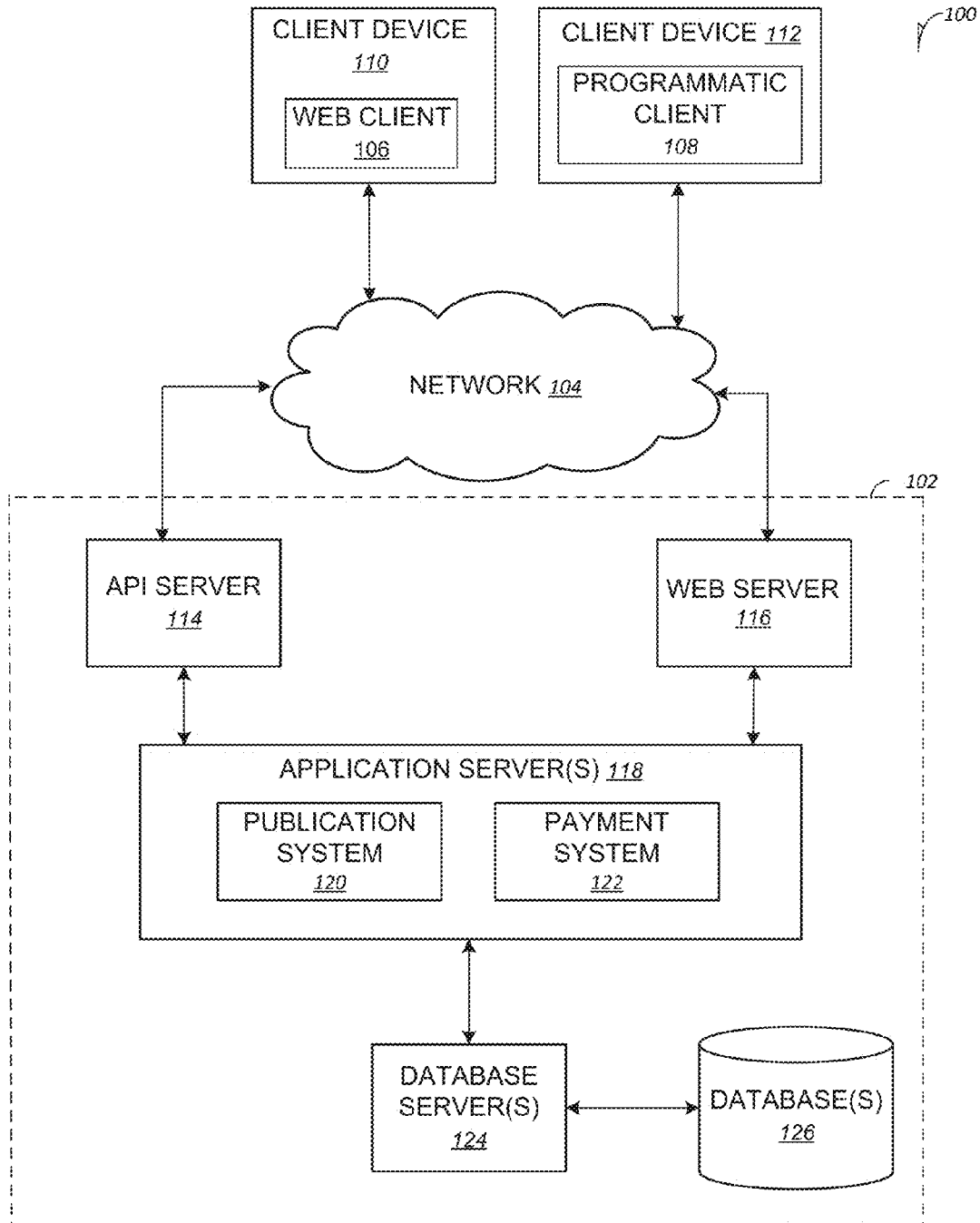


FIG. 1

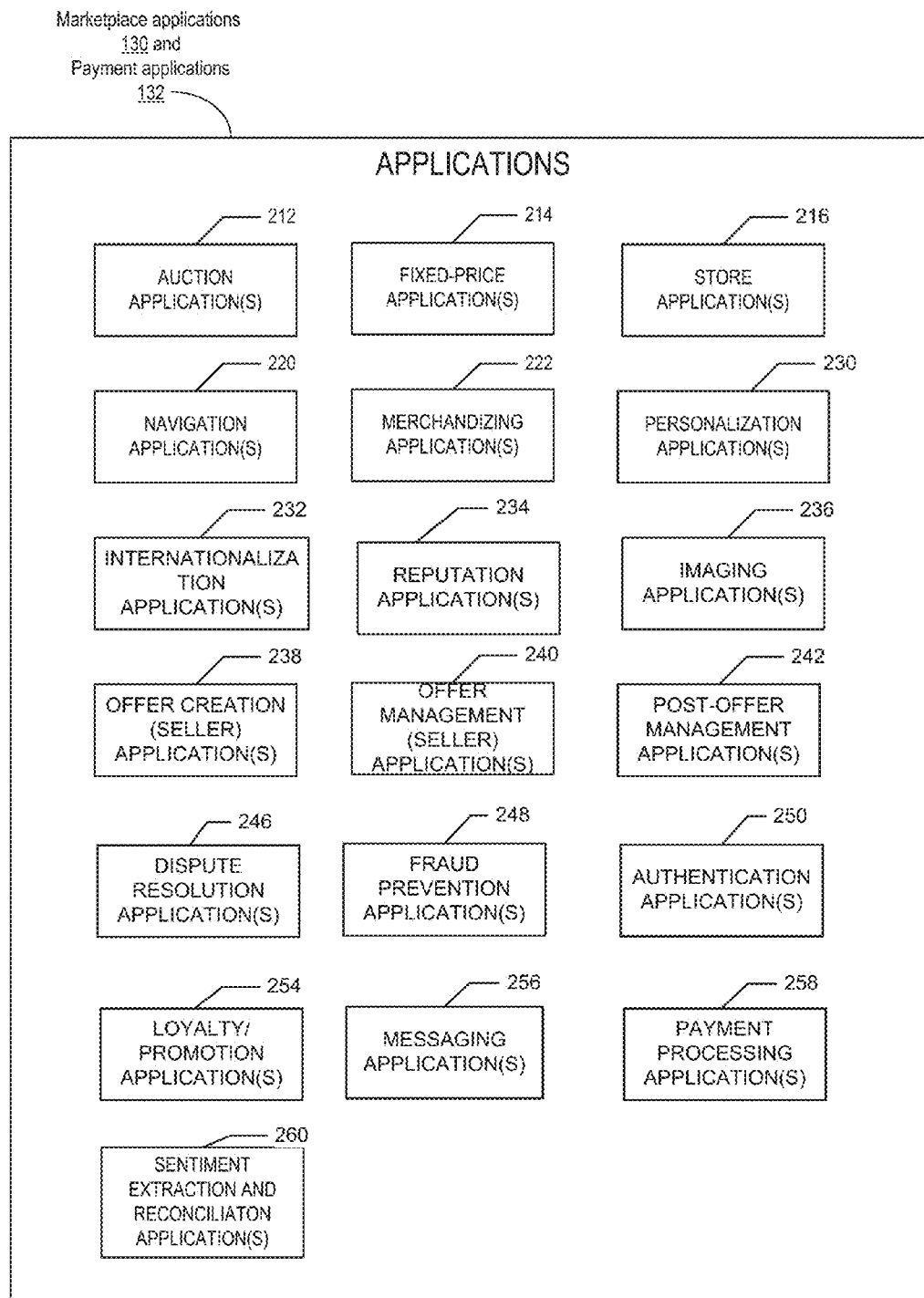
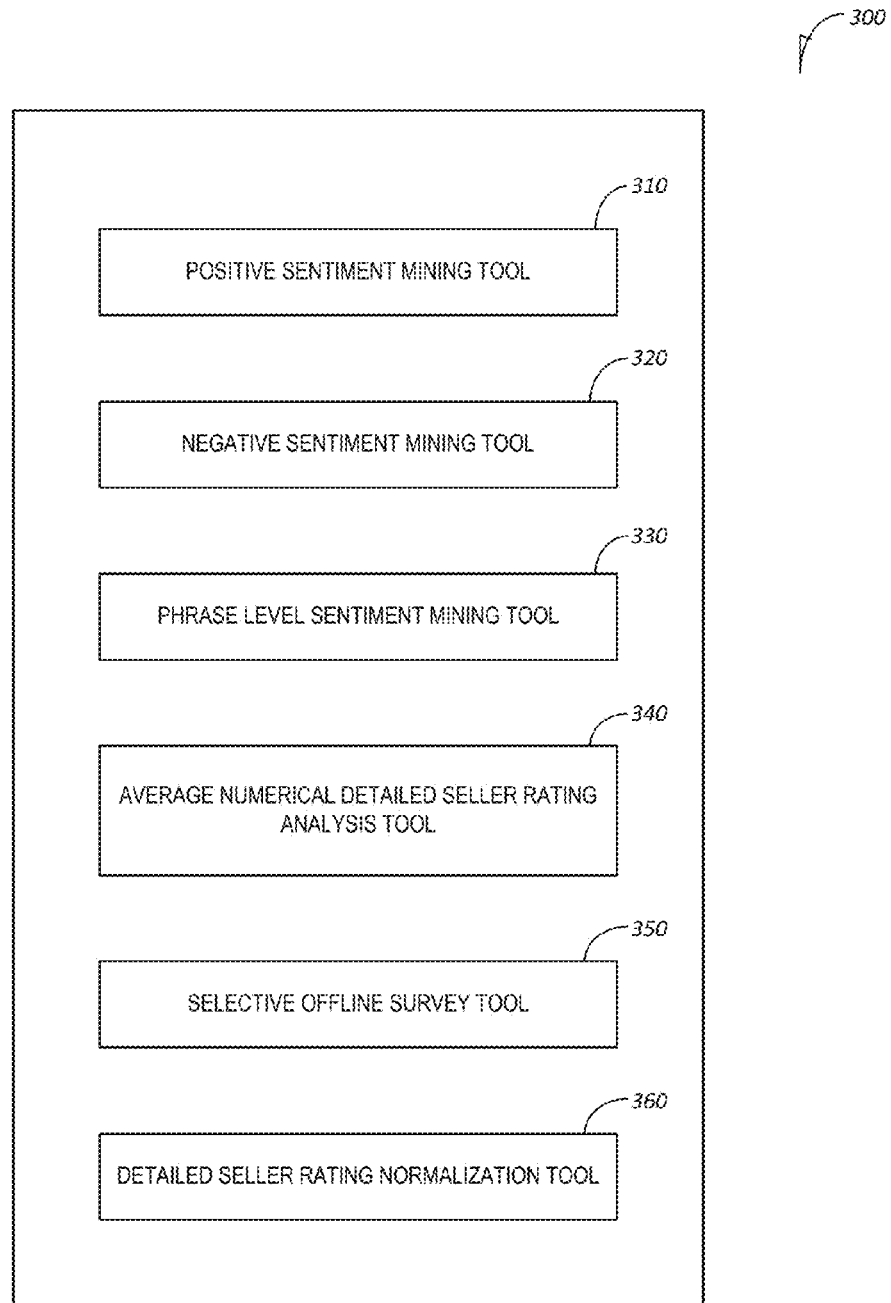
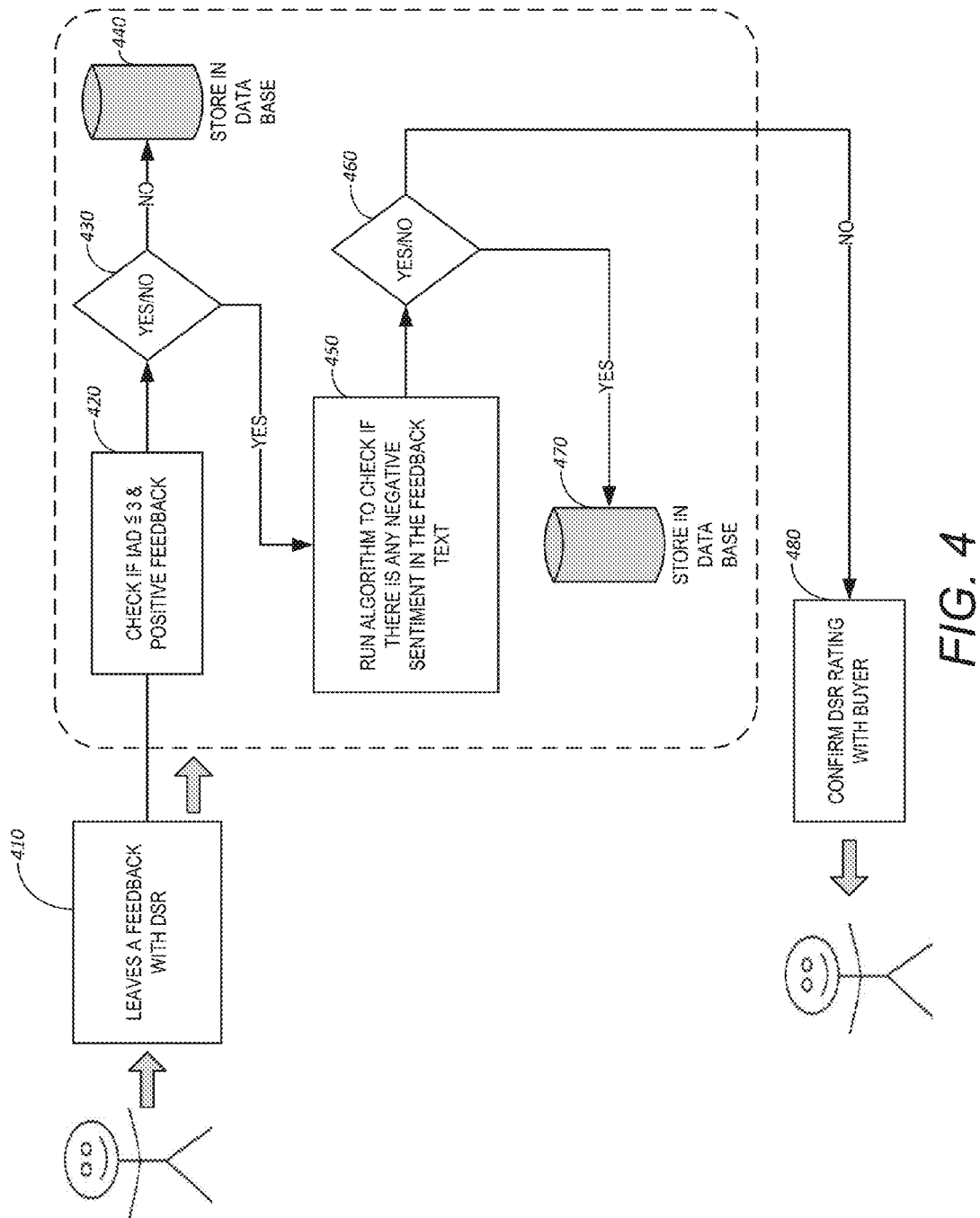


FIG. 2

*FIG. 3*



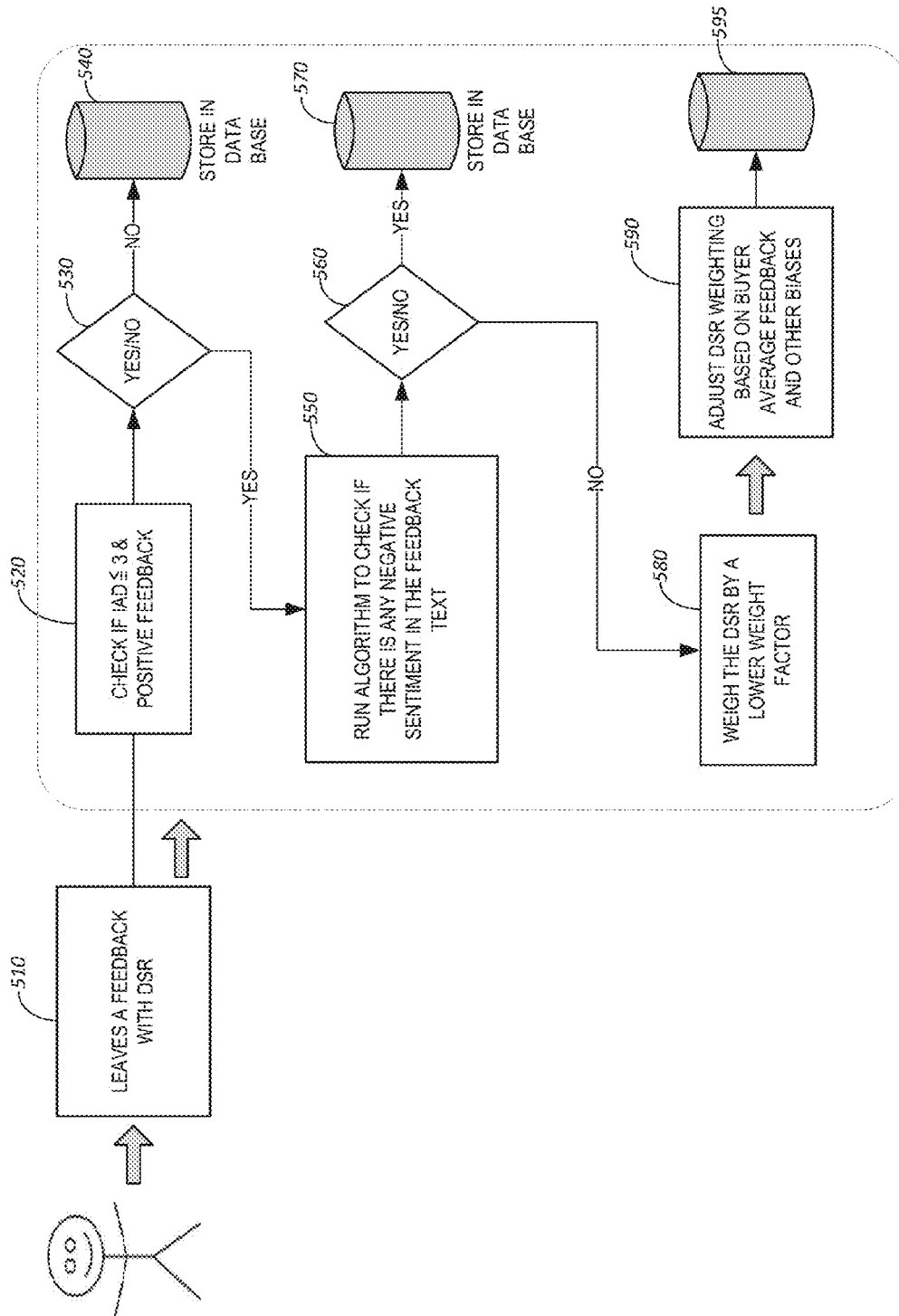
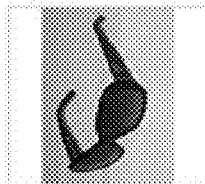


FIG. 5



410A

Prada Authentic Sunglasses PR31NS PR 31NS 1AB3M1 Black Grey NEW! [order details]



Seller: samadayshipping (8640 ★) [icon]

Item condition: New with tags ?

Shipping: Free shipping

Payment date: Apr-08-13

Estimated delivery: Wed. Apr. 10 to Fri. Apr. 12

Track shipment

Rate this transaction 411A

☒ Positive ☐ Neutral ☐ Negative ☐ I'll leave Feedback later

Tell us more

80 characters left

413A

Rate details about this purchase 415A

How accurate was the item description?

How satisfied were you with the seller's communication?

How quickly did the seller ship the item?

★★★★★ Very accurate

★★★★★ Very satisfied

★★★★★ Very quickly

FIG. 6

470A

Rate this transaction

☒ Positive ☐ Neutral ☐ Negative ☐ I'll leave Feedback later

Full review

☒ Good, But received late  
its characters left

Rate details about this purchase

How accurate was the item description?

Why weren't you satisfied with the item description?

- ☐ Item was not received
- ☐ Quality did not match item description
- ☐ Item was damaged
- ☐ Item was a counterfeit, replica, or an unauthorized copy
- ☐ Wrong item
- ☐ Other

★★★★★ Inaccurate

471

Store in DB

YES

<3 IAD, and negative feedback text

FIG. 7

420A

**NO**

Rate this transaction

☒ Positive ☐ Neutral ☐ Negative ☐ I'll leave Feedback later

Tell us more

A+++ seller Thanks  
60 characters left

Rate details about this purchase

How accurate was the item description?

★★★★★ Inaccurate

Why weren't you satisfied with the item description?

- ☐ Item was not received
- ☐ Quality did not match item description
- ☐ Item was damaged
- ☐ Item was a counterfeit, replica, or an unauthorized copy
- ☐ Wrong item
- ☐ Other

<3 IAD, and positive feedback text

FIG. 8

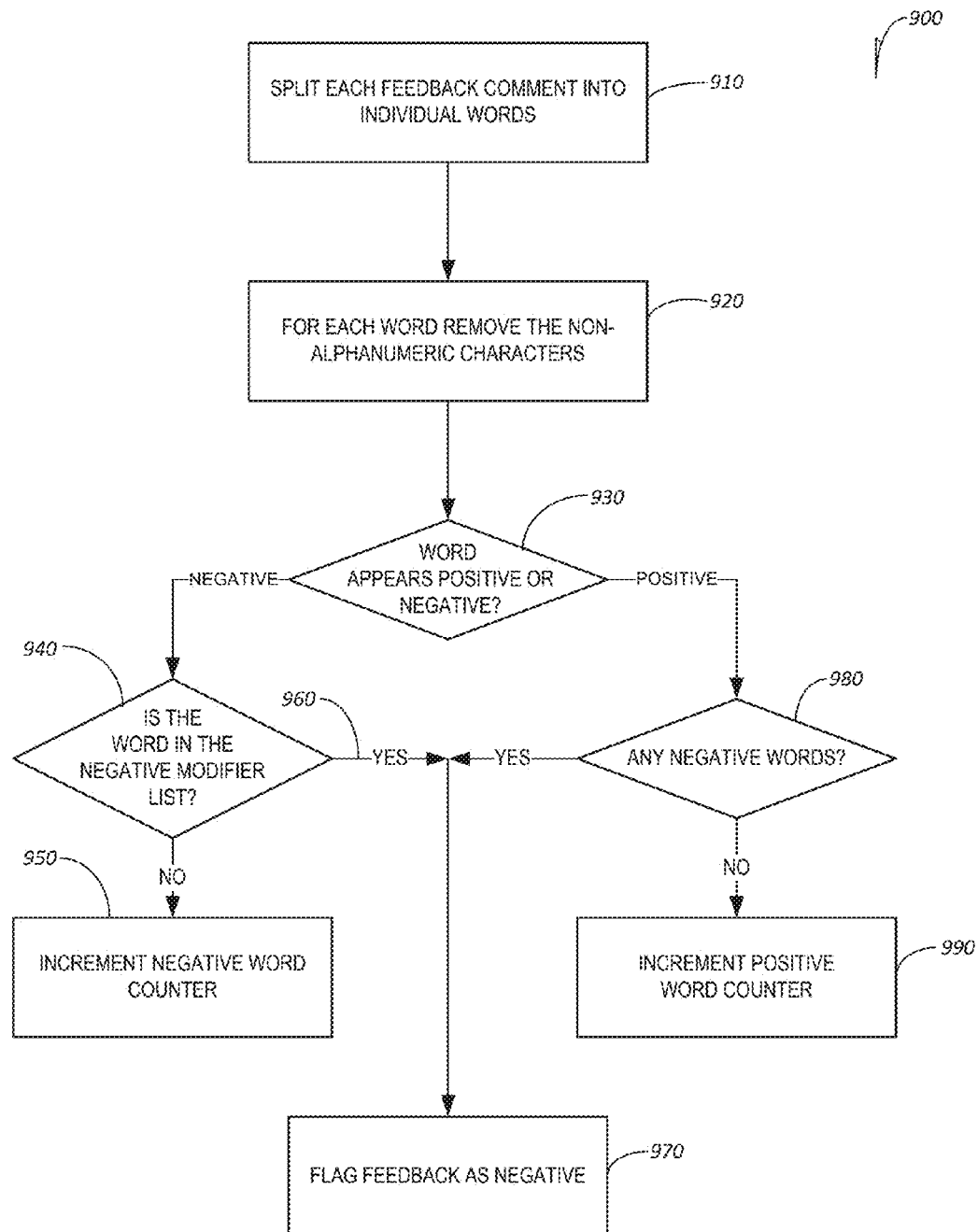


FIG. 9

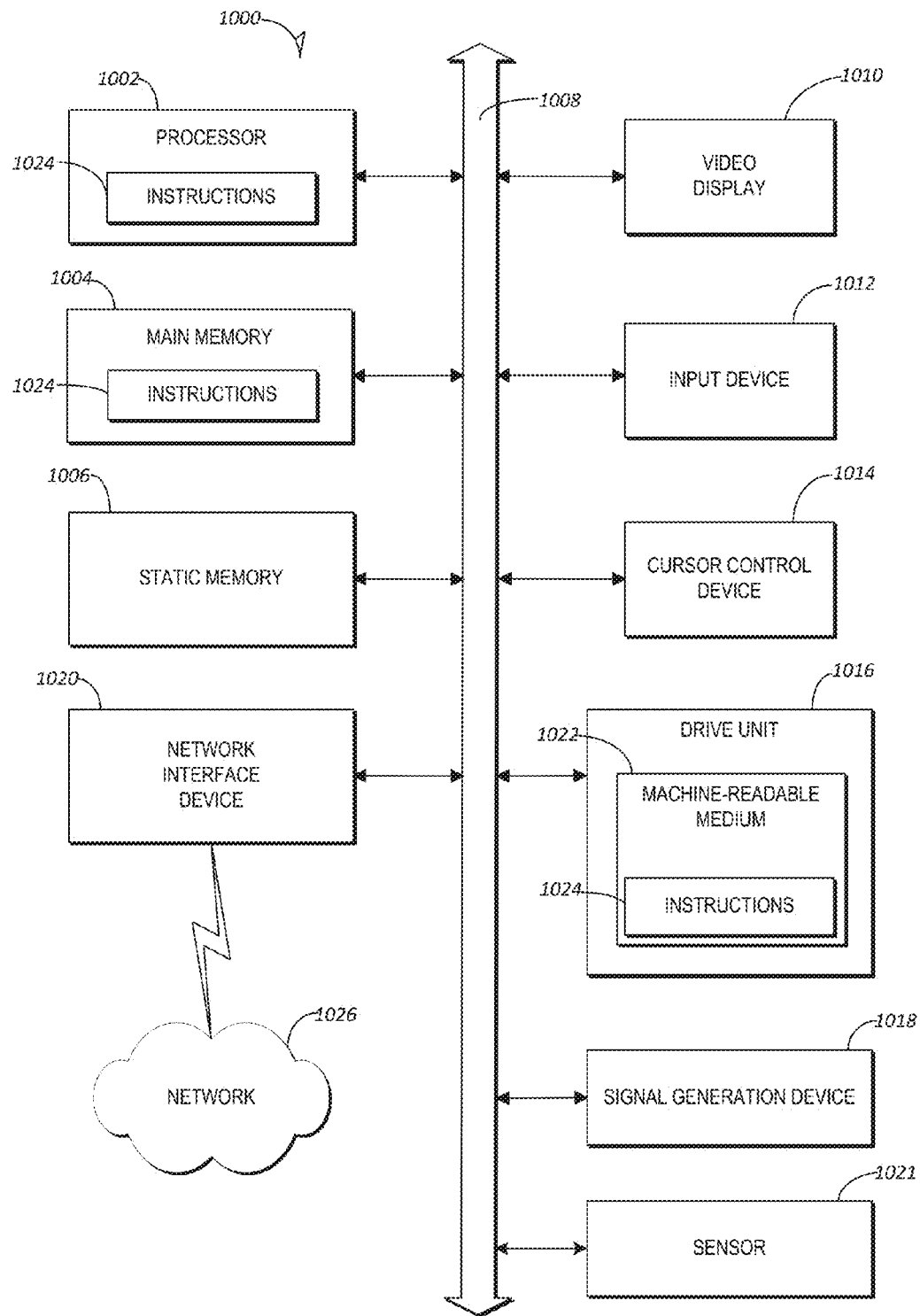


FIG. 10

RECONCILING DETAILED TRANSACTION  
FEEDBACK

TECHNICAL FIELD

The present application relates generally to the technical field of user-provided feedback that addresses the user experience in a given online transaction.

BACKGROUND

Ecommerce feedback is one of the core innovations that has enabled the success of ecommerce. It not only showcases the performance of sellers/buyers in the market place but it is also used to incentivize sellers in terms of fees and to measure trust and Bad Buyer Experiences (“BBE”) on an ecommerce site. But many customers do not fully understand what each numerical DSR rating, sometimes referred to herein as a detailed seller rating or “DSR” is supposed to mean, sometimes resulting in anomalous or inconsistent DSR’s.

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings in which:

FIG. 1 is a block diagram illustrating a networked system, according to example embodiments;

FIG. 2 is a block diagram of application servers that may form a part of the networked system of FIG. 1, according to example embodiments

FIG. 3 is an illustration of a sentiment extraction and reconciliation application according to an example embodiment;

FIG. 4 is an illustration of flowchart of sentiment mining according to an example embodiment;

FIG. 5 is an illustration of a flowchart of sentiment mining showing adjusting feedback about a seller according to an example embodiment;

FIGS. 6 through 8 are user interfaces that may be used in conjunction with the workflows of FIGS. 4 and 5 according to an example embodiment;

FIG. 9 is a flowchart illustrating a method according to an example embodiment; and

FIG. 10 is a block diagram of an example machine on which components of various embodiments of the system may be executed.

DETAILED DESCRIPTION

As one example, feedback may be given on some ecommerce sites by users, who may be a buyer, as a numeric scale from 1 to 5, where 1 may be low satisfaction and 5 may be high satisfaction. But the actual scale from 1 to 5 (for example, what level of satisfaction is a 2, what level of satisfaction is a 3, what level of satisfaction is a 4, etc.) it is left to user interpretation.

There are cases on ecommerce sites where buyers leave a numerical DSR=3 rating (often considered a mediocre rating) but give glowing praises to the seller in feedback text which may be filled in as part of the feedback. For example the feedback text may say “Very nice.” “Thanks for the quick delivery.” “Grandson loves it.” “I would buy from you again.” But these high praise comments do not comport with the above mediocre DSR rating of 3. In other cases, the foregoing high praise may even result in a DSR rating of 2, which is considered low. These examples illustrate anomalous or even contradictory DSR ratings, for example, the numeral DSR

number does not match what one would expect, given the glowing praise of the feedback text, or vice versa. This may be due to the buyer’s misunderstanding or misinterpretation of the meaning of each numeral in the 1-5 scale. This may also be due to feedback influenced by biases introduced by such things as cultural aspects and geographical location. For example, some cultures may habitually give low DSRs, even for good service.

Ecommerce site operators have noted that feedback text are often pithy and use very short text. Users may use various decorations using special characters in their feedback text, to make the feedback look pretty. This text, decorations and special characters such as emoticons may indicate the sentiment of emotion of the user when the feedback text is entered. Focusing on feedback phrase level emotion mining, or “sentiment mining,” has been found to be useful in understanding more precisely the meaning of a given numerical DSR rating. This emotion mining is not limited to single sentiment in a feedback comment. There could be multiple sentiments within the text of a feedback comment. For example, one part of the feedback text may be positive (“I really liked the jeans”) and another part of the feedback text may be negative (“but the shipment took too long to arrive”).

Stated another way, sentiment mining is an entire “package” of determining positive sentiment and negative sentiment in feedback text. Sentiment mining may be implemented using not only opinion lexicons containing standard words but may also be implemented from human or machine learned sentiments from negative feedback provided to the ecommerce system over time.

For example, negative modifiers may also be taken into account which, when detected or “mined” from feedback text may be an indication of a bad buying experience (“BBE”). This allows detection of feedback text where the user is not pleased, for example by saying I am not happy. Examples of negative modifiers may be:

TABLE 1

not
none
doesn't
doesnt
didnt
didn't
wouldn't
wouldnt
wont
won't
shouldnt
shouldn't
isn't
isnt
wasnt
wasn't
aren't
arent
werent
weren't
aint
ain't
couldn't
couldnt
can't
cant

In addition, certain words used in feedback text may be found, over time, to have specific negative connotations. Examples of words that may be determined to have specific negative connotations may be:

3

TABLE 2

different
differ
counterfeit
fake
cheap
issue
issues
ignore
ignored
broken
late

4

Examples of contrasting conjunctions may be:

TABLE 3

5	but
	although
	instead
	never
	yet
	than
10	however

Also, certain contrasting conjunctions may be mined and taken into account as a part of sentiment mining. Contrasting conjunctions may detect feedback in which the user makes a positive statement about the seller but also contrasts the positive statement with another, perhaps negative, comment in the feedback text.

Positive sentiment may be mined using a positive lexicon. For example, positive words such as those in Table 4 below may be used for this purpose. Examples of words of a positive lexicon are seen in the table below. Many additional positive lexicon words will be apparent to those of ordinary skill in the art.

a+	abound	abounds	abundance	abundant
accessible	accessible	acclaim	acclaimed	acclamation
accolade	accolades	accommodative	acomodative	accomplish
accomplished	accomplishment	accomplishments	accurate	accurately
achievable	achievement	adequate	achievable	acumen
adaptable	adaptive	admire	adjustable	admirable
admirably	admiration	adore	admirer	admiring
admiringly	adorable	adroit	adored	adorer
adoring	adoringly	advanced	adroitly	adulate
adulation	adulatory	adventuresome	advantage	advantageous
advantageously	advantages	affability	adventurous	advocate
advocated	advocates	affectionate	affable	affably
affectation	affection	affluence	affinity	affirm
affirmation	affirmative	affordable	affluent	afford
affordable	affordably	agreeable	agile	agilely
agility	agreeable	agreeableness	agreeably	all-around
alluring	alluringly	altruistic	altruistically	amaze
amazed	amazement	amazes	amazing	amazingly
ambitious	ambitiously	ameliorate	amenable	amenity
amiability	amiably	ample	amicability	amicable
amicably	amity	angel	amply	amuse
amusing	amusingly	angel	angelic	apotheosis
appeal	appealing	applaud	appreciable	appreciate
appreciated	appreciates	appreciative	appreciatively	appropriate
approval	approve	ardent	ardently	ardor
articulate	aspiration	aspirations	aspire	assurance
assurances	assure	assuredly	assuring	astonish
astonished	astonishing	astonishingly	astonishment	astound
astounded	astounding	astutely	astute	attentive
attraction	attractive	attune	attune	audible
audibly	auspicious	authoritative	authoritative	autonomous
available	aver	avid	avidly	award
awarded	awards	awe	awed	awesome
awesomely	awesomeness	awe	awesome	backbone
balanced	bargain	awe	beautiful	beautifully
beautifully	beautify	awe	beckon	beckoned
beckoning	beckons	awe	believable	beloved
benefactor	beneficent	awe	beneficial	beneficiary
benefit	benefits	awe	benevolent	benefits
best	best-known	awe	best-selling	better
better-known	better-than-expected	awe	blameless	bless
blessing	bliss	awe	blissfully	blithe
blockbuster	bloom	awe	bolster	bonny
bonus	bonuses	awe	booming	boost
boundless	bountiful	awe	brainy	brand-new
brave	bravery	awe	breakthrough	breakthroughs
breathlessness	breathtaking	awe	breeze	bright
brighten	brighter	awe	brilliance	brilliances
brilliant	brilliantly	awe	brotherly	bullish
buoyant	cajole	awe	calming	calmness
capability	capable	awe	captivate	captivating
carefree	cashback	awe	catchy	celebrate
celebrated	celebration	awe	champ	champion

In addition, colloquialisms that may be specific to a given ecommerce system, as well as slang and sarcasms, may be

detected in feedback text and used in sentiment mining. Further, there may be cases taken into account in the sentiment

5

mining described where words in the feedback text that typically indicate negative sentiment bearing may not, in fact, be negative. For example, in the term “excellent worn-out jeans,” the term “worn-out” is usually a negative term. However, if the product were so called “destroyed jeans” (that is, jeans manufactured to be faded or torn to give the appearance of having been worn and washed several times) the term “worn-out” could be considered a positive sentiment.

The following disclosure addresses these problems by extracting the sentiment from the feedback text using the components discussed above for sentiment mining, and then reconciling the sentiment with the numerical DSR rating. The DSRs may then be normalized by eliminating individual biases. This may be done for individual buyers sometimes referred to as being done on a “per buyer” basis.

In an embodiment, offline data mining preparation may include mining from one or more historical ecommerce transaction logs. Known specific negative words may be mined from the text of feedback text from the transaction log. Phrase-level emotion or sentiment language may be mined from the feedback text to detect negative sentiment. The average numerical DSRs may be analyzed, in one embodiment on a continual basis, for each geography of the ecommerce system, each category of listed item, each average selling price, and the like. These average DSRs may later be used in DSR normalization to be discussed below.

Sentiment may then be mined from the feedback text and compared with the respective DSRs provided by the user. The discrepancy between the mined negative sentiments and the respective DSRs may be reconciled in the flow. Reconciliation may be done either real-time online when the buyer is leaving contradictory feedback or in an offline mode where separate offline survey could be conducted to derive the weights the current DSR rating should carry when it differs from feedback text. Weights given to the DSRs may then be auto-adjusted to reflect the disagreement between the numerical value of the DSRs and the mined sentiments from the DSRs. DSR ratings may be computed by taking a simple average of all the DSRs given to a seller by buyers of his items. A way of deriving at the aggregate DSR ratings could be envisioned in which weight for the ratings, where the feedback text and rating do not appear consistent, is lowered. The exact weight could be derived in a data driven way. For example, in an embodiment, a selective offline survey may be addressed to buyers who left numerical DSRs that did not match the detected sentiment in the feedback text that the buyers left with their DSRs. The answers to the survey may be used in DSR normalization.

FIG. 1 is a networked diagram depicting a networked system 100, according to one embodiment, having a client-server architecture configured for exchanging data over a networked. For example, the networked system 100 may include a network-based publisher 102 where clients may communicate and exchange data within the networked system 100. The data may pertain to various functions (e.g., online item purchases) and aspects (e.g., managing content) associated with the networked system 100 and its users. Although illustrated herein as a client-server architecture as an example, other embodiments may include other networked architectures, such as a peer-to-peer or distributed networked environment.

A data exchange platform, in an example form of a network-based publisher 102, may provide server-side functionality, via a network 104 (e.g., the Internet, wireless network, cellular network, or a Wide Area Network (WAN)) to one or more clients. The one or more clients may include users that utilize the networked system 100 and more specifically, the network-based publisher 102, to exchange data over the net-

6

work 104. These transactions may include transmitting, receiving (communicating) and processing data to, from, and regarding content and users of the networked system 100. The data may include, but are not limited to, content and user data such as feedback data; user profiles; user attributes; product attributes; product and service reviews; product, service, manufacture, and vendor recommendations and identifiers; social network commentary, product and service listings associated with buyers and sellers; auction bids; and transaction data, among other things.

In various embodiments, the data exchanges within the networked system 100 may be dependent upon user-selected functions available through one or more client or user interfaces (UIs). The UIs may be associated with a client device, such as a client device 110 using a web client 106. The web client 106 may be in communication with the network-based publisher 102 via a web server 116. The UIs may also be associated with a client device 112 using a programmatic client 108, such as a client application. It can be appreciated in various embodiments the client devices 110, 112 may be associated with a buyer, a seller, a third party electronic commerce platform, a payment service provider, or a shipping service provider, each in communication with the network-based publisher 102 and optionally each other. The buyers and sellers may be any one of individuals, merchants, or service providers, among other things. The client devices 110 and 112 may comprise a mobile phone, desktop computer, laptop, or any other communication device that a user may use to access the network-based publisher 102.

Turning specifically to the network-based publisher 102, an application program interface (API) server 114 and a web server 116 are coupled to, and provide programmatic and web interfaces respectively to, one or more application servers 118. The application servers 118 host one or more publication application(s) of publication system 120 and one or more payment systems 122. The application server(s) 118 are, in turn, shown to be coupled to one or more database server(s) 124 that facilitate access to one or more database(s) 126.

In one embodiment, the web server 116 and the API server 114 communicate and receive data pertaining to products, listings, transactions, social network commentary and feedback, among other things, via various user input tools. For example, the web server 116 may send and receive data to and from a toolbar or webpage on a browser application (e.g., web client 106) operating on a client device (e.g., client device 110). The API server 114 may send and receive data to and from an application (e.g., client application 108) running on another client device (e.g., client device 112).

The publication system 120 publishes content on a network (e.g., the Internet). As such, the publication system 120 provides a number of publication and marketplace functions and services to users that access the network-based publisher 102. For example, the publication application(s) of publication system 120 may provide a number of services and functions to users for listing goods and/or services for sale, facilitating transactions, and reviewing and providing feedback about transactions and associated users. Additionally, the publication application(s) of publication system 120 may track and store data and metadata relating to products, listings, transactions, and user interaction with the network-based publisher 102. The publication application(s) of publication system 120 may aggregate the tracked data and metadata to perform data mining to identify trends or patterns in the data. While the publication system 120 may be discussed in terms of a marketplace environment, it may be noted that the publication system 120 may be associated with a non-marketplace environment.



The payment system **122** provides a number of payment services and functions to users. The payment system **122** allows users to accumulate value (e.g., in a commercial currency, such as the U.S. dollar, or a proprietary currency, such as "points") in accounts, and then later to redeem the accumulated value for products (e.g., goods or services) that are made available via the publication system **120**. The payment system **122** also facilitates payments from a payment mechanism (e.g., a bank account, PayPal account, or credit card) for purchases of items via the network-based marketplace. While the publication system **120** and the payment system **122** are shown in FIG. 1 to both form part of the network-based publisher **102**, it will be appreciated that, in alternative embodiments, the payment system **122** may form part of a payment service that may be separate and distinct from the network-based publisher **102**.

Application Server(s)

FIG. 2 illustrates a block diagram showing applications of application server(s) that are part of the networked system **100**, in an example embodiment. In this embodiment, the publication system **120**, and the payment system **120** may be hosted by the application server(s) **118** of the networked system **100**. The publication system **120** and the payment system **132** may be hosted on dedicated or shared server machines (not shown) that are communicatively coupled to enable communications between server machines. The applications themselves may be communicatively coupled (e.g., via appropriate interfaces) to each other and to various data sources, so as to allow information to be passed between the applications or so as to allow the applications to share and access common data.

The publication system **120** are shown to include at least one or more auction application(s) **212** which support auction-format listing and price setting mechanisms (e.g., English, Dutch, Vickrey, Chinese, Double, Reverse auctions etc.). The auction application(s) **212** may also provide a number of features in support of such auction-format listings, such as a reserve price feature whereby a seller may specify a reserve price in connection with a listing and a proxy-bidding feature whereby a bidder may invoke automated proxy bidding. The auction-format offer in any format may be published in any virtual or physical marketplace medium and may be considered the point of sale for the commerce transaction between a seller and a buyer (or two users).

One or more fixed-price application(s) **214** support fixed-price listing formats (e.g., the traditional classified advertisement-type listing or a catalogue listing) and buyout-type listings. Specifically, buyout-type listings (e.g., including the Buy-It-Now® (BIN) technology developed by eBay Inc., of San Jose, Calif.) may be offered in conjunction with auction-format listings, and allow a buyer to purchase goods or services, which are also being offered for sale via an auction, for a fixed-price that may be typically higher than the starting price of the auction.

The application(s) of the application server(s) **118** may include one or more store application(s) **216** that allow a seller to group listings within a "virtual" store. The virtual store may be branded and otherwise personalized by and for the seller. Such a virtual store may also offer promotions, incentives and features that are specific and personalized to a relevant seller.

Navigation of the online marketplace may be facilitated by one or more navigation application(s) **220**. For example, a search application (as an example of a navigation application) may enable key word searches of listings published via the network-based publisher **102**. A browse application may allow users to browse various category, catalogue, or inven-

tory data structures according to which listings may be classified within the network-based publisher **102**. Various other navigation applications may be provided to supplement the search and browsing applications.

Merchandizing application(s) **222** support various merchandising functions that are made available to sellers to enable sellers to increase sales via the network-based publisher **102**. The merchandizing application(s) **222** also operate the various merchandising features that may be invoked by sellers, and may monitor and track the success of merchandizing strategies employed by sellers.

Personalization application(s) **230** allow users of the network-based publisher **102** to personalize various aspects of their interactions with the network-based publisher **102**. For example, a user may, utilizing an appropriate personalization application **230**, create a personalized reference page at which information regarding transactions to which the user may be (or has been) a party may be viewed. Further, the personalization application(s) **230** may enable a third party to personalize products and other aspects of their interactions with the network-based publisher **102** and other parties, or to provide other information, such as relevant business information about themselves.

The publication system **120** may include one or more internationalization application(s) **232**. In one embodiment, the network-based publisher **102** may support a number of marketplaces that are customized, for example, for specific geographic regions. A version of the network-based publisher **102** may be customized for the United Kingdom, whereas another version of the network-based publisher **102** may be customized for the United States. Each of these versions may operate as an independent marketplace, or may be customized (or internationalized) presentations of a common underlying marketplace. The network-based publisher **102** may accordingly include a number of internationalization application(s) **232** that customize information (and/or the presentation of information) by the network-based publisher **102** according to predetermined criteria (e.g., geographic, demographic or marketplace criteria). For example, the internationalization application(s) **232** may be used to support the customization of information for a number of regional websites that are operated by the network-based publisher **102** and that are accessible via respective web servers.

Reputation application(s) **234** allow users that transact, utilizing the network-based publisher **102**, to establish, build and maintain reputations, which may be made available and published to potential trading partners. Consider that where, for example, the network-based publisher **102** supports person-to-person trading, users may otherwise have no history or other reference information whereby the trustworthiness and credibility of potential trading partners may be assessed. The reputation application(s) **234** allow a user, for example through feedback provided by other transaction partners, to establish a reputation within the network-based publisher **102** over time. Other potential trading partners may then reference such a reputation for the purposes of assessing credibility and trustworthiness.

In order to make listings, available via the network-based publisher **102**, as visually informing and attractive as possible, the publication system **120** may include one or more imaging application(s) **236** utilizing which users may upload images for inclusion within listings. An imaging application **236** also operates to incorporate images within viewed listings. The imaging application(s) **236** may also support one or more promotional features, such as image galleries that are presented to potential buyers. For example, sellers may gen-

erally pay an additional fee to have an image included within a gallery of images for promoted items.

The publication system **120** may include one or more offer creation application(s) **238**. The offer creation application(s) **238** allow sellers conveniently to author products pertaining to goods or services that they wish to transact via the network-based publisher **102**. Offer management application(s) **240** allow sellers to manage offers, such as goods, services, or donation opportunities. Specifically, where a particular seller has authored and/or published a large number of products, the management of such products may present a challenge. The offer management application(s) **240** provide a number of features (e.g., auto-reproduct, inventory level monitors, etc.) to assist the seller in managing such products. One or more post-offer management application(s) **242** also assist sellers with a number of activities that typically occur post-offer. For example, upon completion of an auction facilitated by one or more auction application(s) **212**, a seller may wish to leave feedback regarding a particular buyer. To this end, a post-offer management application **242** may provide an interface to one or more reputation application(s) **234**, so as to allow the seller conveniently to provide feedback regarding multiple buyers to the reputation application(s) **234**.

The dispute resolution application(s) **246** may provide mechanisms whereby disputes arising between transacting parties may be resolved. For example, the dispute resolution application(s) **246** may provide guided procedures whereby the parties are guided through a number of steps in an attempt to settle a dispute. In the event that the dispute cannot be settled via the guided procedures, the dispute may be escalated to a mediator or arbitrator.

The fraud prevention application(s) **248** may implement various fraud detection and prevention mechanisms to reduce the occurrence of fraud within the network-based publisher **102**. The fraud prevention application(s) may prevent fraud with respect to the third party and/or the client user in relation to any part of the request, payment, information flows and/or request fulfillment. Fraud may occur with respect to unauthorized use of financial instruments, non-delivery of goods, and abuse of personal information.

Authentication application(s) **250** may verify the identity of a user, and may be used in conjunction with the fraud prevention application(s) **248**. The user may be requested to submit verification of identity, an identifier upon making the purchase request, for example. Verification may be made by a code entered by the user, a cookie retrieved from the device, a phone number/identification pair, a username/password pair, handwriting, and/or biometric methods, such as voice data, face data, iris data, finger print data, and hand data. In some embodiments, the user may not be permitted to login without appropriate authentication. The system (e.g., the FSP) may automatically recognize the user, based upon the particular network-based device used and a retrieved cookie, for example.

The network-based publisher **102** itself, or one or more parties that transact via the network-based publisher **102**, may operate loyalty programs and other types of promotions that are supported by one or more loyalty/promotions application(s) **254**. For example, a buyer/client user may earn loyalty or promotions points for each transaction established and/or concluded with a particular seller/third party, and may be offered a reward for which accumulated loyalty points can be redeemed.

The application server(s) **118** may include messaging application(s) **256**. The messaging application(s) **256** are responsible for the generation and delivery of messages to client users and third parties of the network-based publisher

**102**. Information in these messages may be pertinent to services offered by, and activities performed via, the payment system **120**. Such messages, for example, advise client users regarding the status of products (e.g., providing "out of stock" or "outbid" notices to client users) or payment status (e.g., providing invoice for payment, Notification of a Payment Received, delivery status, invoice notices). Third parties may be notified of a product order, payment confirmation and/or shipment information. Respective messaging application(s) **256** may utilize any one of a number of message delivery networks and platforms to deliver messages to users. For example, messaging application(s) **256** may deliver electronic mail (email), instant message (IM), Short Message Service (SMS), text, facsimile, or voice (e.g., Voice over IP (VoIP)) messages via the wired (e.g., the Internet), Plain Old Telephone Service (POTS), or wireless (e.g., mobile, cellular, WiFi, WiMAX) networks.

The payment system **120** may include one or more payment processing application(s) **258**. The payment processing application(s) **258** may receive electronic invoices from the merchants and may receive payments associated with the electronic invoices. The payment system **120** may also make use of functions performed by some applications included in the publication system **120**.

The publication system **120** may include one or more sentiment extraction and reconciliation applications **260**.

FIG. 3 is an illustration of a sentiment extraction and reconciliation application **300**, which is a further description of item **260** of FIG. 2 according to an example embodiment. In one embodiment sentiment extraction and reconciliation application **300** of FIG. 3 may operate offline if desired and may mine historical transaction logs of an ecommerce system. This sentiment mining may be done on a continual basis if desired, or mined from time to time. Item **300** may include positive sentiment mining tool **310** which may be an application for detecting positive words such as those in Table 1, or other words learned to indicate positive sentiment.

Item **300** may also include negative sentiment mining tool **320** which may be an application for detecting negative modifiers such as those of Table 1, above, detecting words having negative connotations, such as those of Table 2, above, and detecting contrasting conjunctions such as those in Table 3, above; and also for detecting words learned to indicate negative sentiment.

Phrase level sentiment mining tool **330** may be an application for detecting phrase-level sentiment. The comments left by Buyers for sellers are pithy and can cover various aspects of the transaction in a not grammatically well formed manner. For example, a feedback comment could be "Got it fast, received in great condition". Here buyer is expressing his feelings about ship time as well as item condition. These two comment segments may be separated using the obvious markers like comma, semi colon, colon, multiple spaces or tabs, periods and other punctuation marks. When no punctuation marks are available, probabilistic techniques like Hidden Markov Models (HMM) could be used to break one feedback comment into comment segments. Once comment segments are identified, sentiment mining could be done on each phrase/segment to extract positive/negative feelings of the buyer towards a specific aspect of the transaction.

Average numerical detailed seller rating (DSR) analysis tool **340** may be an application for analyzing the DSR of users in the transaction logs. Item **340** may analyze, on a continual basis if desired, or periodically, may analyze average DSRs left selected geographies, item listing category, average selling price, and/or other desirable indicators to determine whether there is any feedback bias in any of the foregoing

selections, for example, by culture, country, or otherwise. In one embodiment the average DSR rating given by a user in the past year for positive feedback transactions may be detected. Then that average may be applied to current DSRs to determine true BBEs in those DSRs.

Selective offline survey **350** may be an application for surveying buyers whose DSRs were detected in the above analysis not to match the sentiment in the respective buyer's sentiment in the feedback texts. This clarification survey may reconcile the meaning of the feedback text and a DSR. In one embodiment the results of this clarification survey may be used to adjust the DSR or the feedback text.

Detailed seller rating normalization tool **360** may then normalize seller ratings according to an auto-adjustment procedure. The tool may find the average IAD detailed seller rating that a buyer tends to leave. This average is computed for each buyer's transactions in the past year for which positive feedback was left and no dispute was filed by the buyer. This average value for each buyer can be used to normalize his DSRs.

FIG. **4** is an illustration of flowchart, or work flow, of sentiment mining according to an example embodiment. At **410** a user, here a buyer, provides feedback text and a numerical detailed seller rating. This may be seen in further detail on the user interface **410A** of FIG. **6** in which the seller has the opportunity of rating the transaction at **411A**, of leaving feedback text at **413A**, and of providing one or more numerical DSRs about the purchase at **415A**. In this example embodiment the scale may indicate 1-5 reading left to right, where 1 is low and 5 is high. The detailed seller rating normalization **360** tool finds the average DSR that a buyer tends to leave. This average is computed for each buyer's transactions in the past year for which positive feedback was left and no dispute was filed by the buyer. This average value for each buyer can be used to normalize his DSRs.

At **420** whether the DSR is less than or equal to a 3 is checked for by well-known comparison methods. As discussed above, a rating of 3 is considered in the present instance as being a mediocre rating, so ratings of 3 or less are used for checking purposes. A reason for checking for ratings of 3 or less is that as part of analyzing feedback text to understand the reasons why negative/neutral DSR may be provided, initial analysis began by looking into feedback text. Inasmuch as IAD DSRs (ratings of the truth of the "Item As Described") form a good portion of BBEs, analysis initially focused on IAD DSRs of less than or equal to 3 (which, while "mediocre" may for business purposes be considered an indication of a BBE) and on the corresponding BBEs. Analyzing the feedback text of the few of the IAD DSRs that were less than or equal to 3, indicated that there were a good amount of purely positive feedback text in IAD DSRs that numerically indicated a BBE. This appears to be a contradiction. This determination may be performed using specific positive word mining tool **310**, negative sentiment mining tool **320**, and phase level sentiment mining tool **330** as discussed further below. At **430** a determination of whether there is positive feedback in the feedback text is made. If there is no positive feedback for an IAD of less than or equal to 3, the feedback is considered non-contradictory, and it is stored in database **440** for subsequent use. A positive sentiment word lexicon such as that in Table 4 may be used to see if there are positive sentiments in the Feedback. Using this along with negative modifier lists, and contrasting conjunctions, discussed above, allows determining if the feedback has only positive sentiment.

If, on the other hand, there is positive feedback text in an IAD of less than or equal to 3, an algorithm, discussed below,

is run at **450** to check if there is any negative sentiment in the feedback text. Again, this may be accomplished at least in part by phrase level sentiment mining tool **330** discussed above in connection with FIG. **3**. If the decision at **460** is yes (i.e., there is negative sentiment in the feedback text), then the feedback text and the low IAD DSR may be considered to be consistent. An example of this is seen at the UI **470A** of FIG. **7**. In this case, the feedback text ("But received late") was negative, and the IAD DSR at **471** was 2, so the negative feedback text and the low IAD are thought to be consistent, and the IAD DSR is stored in database **470** in FIG. **4** for future use.

If decision **460** detects that there is no negative sentiment feedback then the feedback text and the IAD DSR of 2 may be considered inconsistent and the DSR may be confirmed with the buyer as at **480** so that discrepancies between the feedback text and the IAD numerical rating are reconciled. This inconsistency may be seen at the user interface **480A** in FIG. **8** where the transaction is rated "positive," (i.e., the feedback text is "A+++ seller. Thanks") but the IAD is a 2, as at **481**.

FIG. **5** is an illustration of a flowchart of sentiment mining showing adjusting feedback about a seller according to an example embodiment. FIG. **5** is much the same as FIG. **4** so only the differences will be discussed here. These differences are that if the decision **560** from the algorithm that is run at **550** (which may be the same algorithm as at step **450** of FIG. **4**) is that there is no negative sentiment expressed in the feedback text, then the low IAD of less than or equal to 3, and the lack of negative sentiment in the feedback text, appear inconsistent. This may be reconciled as indicated at **580** by assigning a lower weight factor to the DSR because of the apparent inconsistency. The DSR weighting may be based on buyer average feedback and other biases. As discussed above, these biases may be geographies, item listing category, average selling price, and/or other desirable indicators to determine whether there is any feedback bias in any of the foregoing selections, for example, by culture, country, or otherwise. The adjustment may also be based on average feedback, for example, whether the DSR is significantly different from the DSRs of the user as averaged over a previous period of time as discussed above.

FIG. **9** is a flowchart illustrating a method **900** according to an example embodiment. In sentiment mining of feedback texts, the particular feedback text may be split into individual words as at **910**. The non-alphanumeric characters may be removed from each word as at **920**. At **930** a determination is made as to whether the word under test in the particular feedback text appears positive or negative. The test for positive sentiment may be made using positive sentiment mining tool **310** testing for words such as those in Table 4, and words learned to indicate positive sentiment. The test for negative sentiment may be made using negative sentiment mining tool **320** testing for words such as those in Tables 1, 2, and 3, and words learned to indicate negative sentiment. If the test at **930** determines that the word under test appears positive, then at **980** a decision is made as to whether there are any negative words in the particular feedback text of which the word under test is a part. If Yes, then the feedback text may be flagged as negative as at **970**. If No, then a positive word counter for the particular feedback text may be incremented. The determination of whether there are any negative words in the particular feedback text (in test **980**) may be implemented by testing to determine whether all words in the feedback text have been tested. For example a loop (not shown) could be embodied that determines whether a negative word has been detected in the particular feedback text and, if not, testing to see if the final word of the particular feedback text has been tested for negative. If the final word in a particular feedback text has

13

been tested without encountering a negative word, this would be an indicator to increment the positive word counter as at 990, and as discussed above.

With continued reference to FIG. 9, if a word appears negative at 930 then a test is made at 940 to determine whether the word is in the negative modifier list of Table 1. If the word is in the negative modifier list, the feedback text is flagged as negative at 970, which indicates that the feedback text indicates negative sentiment.

When the test for the particular feedback text is completed (which may be tested by implementation of a loop similar to that discussed above for FIG. 9) the negative word counter and the positive word counter indicate that the feedback test is are totaled and the ratio of positive/(positive+negative) may be used to determine if the feedback is significantly positive. Stated another way, the total and ratio may be considered a calculation of a score or threshold which, if it exceeds a predetermined amount, indicates that the feedback text indicates an overall positive sentiment. The thresholds of positiveness of a feedback comment may be very high but could be adjusted as needed. In one embodiment, the score or threshold is calculated if the test at 940 does not result in the feedback text being flagged as negative as at 970.

When the test for the particular feedback text is completed (which may be tested by implementation of a loop similar to that discussed above for FIG. 9) the negative word counter and the positive word counter are totaled and the ratio of positive/(positive+negative) may be used to determine if the feedback is significantly positive. The thresholds of positiveness of a feedback text may be very high but could be adjusted as needed.

#### Modules, Components, and Logic

Additionally, certain embodiments described herein may be implemented as logic or a number of modules, engines, components, or mechanisms. A module, engine, logic, component, or mechanism (collectively referred to as a “module”) may be a tangible unit capable of performing certain operations and configured or arranged in a certain manner. In certain example embodiments, one or more computer systems (e.g., a standalone, client, or server computer system) or one or more components of a computer system (e.g., a processor or a group of processors) may be configured by software (e.g., an application or application portion) or firmware (note that software and firmware can generally be used interchangeably herein as may be known by a skilled artisan) as a module that operates to perform certain operations described herein.

In various embodiments, a module may be implemented mechanically or electronically. For example, a module may comprise dedicated circuitry or logic that may be permanently configured (e.g., within a special-purpose processor, application specific integrated circuit (ASIC), or array) to perform certain operations. A module may also comprise programmable logic or circuitry (e.g., as encompassed within a general-purpose processor or other programmable processor) that may be temporarily configured by software or firmware to perform certain operations. It will be appreciated that a decision to implement a module mechanically, in dedicated and permanently configured circuitry, or in temporarily configured circuitry (e.g., configured by software) may be driven by, for example, cost, time, energy-usage, and package size considerations.

Accordingly, the term “module” should be understood to encompass a tangible entity, be that an entity that may be physically constructed, permanently configured (e.g., hardwired), or temporarily configured (e.g., programmed) to operate in a certain manner or to perform certain operations

14

described herein. Considering embodiments in which modules or components are temporarily configured (e.g., programmed), each of the modules or components need not be configured or instantiated at any one instance in time. For example, where the modules or components comprise a general-purpose processor configured using software, the general-purpose processor may be configured as respective different modules at different times. Software may accordingly configure the processor to constitute a particular module at one instance of time and to constitute a different module at a different instance of time.

Modules can provide information to, and receive information from, other modules. Accordingly, the described modules may be regarded as being communicatively coupled. Where multiples of such modules exist contemporaneously, communications may be achieved through signal transmission (e.g., over appropriate circuits and buses) that connect the modules. In embodiments in which multiple modules are configured or instantiated at different times, communications between such modules may be achieved, for example, through the storage and retrieval of information in memory structures to which the multiple modules have access. For example, one module may perform an operation and store the output of that operation in a memory device to which it may be communicatively coupled. A further module may then, at a later time, access the memory device to retrieve and process the stored output. Modules may also initiate communications with input or output devices and can operate on a resource (e.g., a collection of information).

#### Example Machine Architecture and Machine-Readable Storage Medium

With reference to FIG. 10 an example embodiment extends to a machine in the example form of a computer system 1000 within which instructions for causing the machine to perform any one or more of the methodologies discussed herein may be executed. In alternative example embodiments, the machine operates as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the machine may operate in the capacity of a server or a client machine in server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine may be a personal computer (PC), a tablet PC, a set-top box (STB), a Personal Digital Assistant (PDA), a cellular telephone, a web appliance, a network router, a switch or bridge, or any machine capable of executing instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine may be illustrated, the term “machine” shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The example computer system 1000 may include a processor 1002 (e.g., a central processing unit (CPU), a graphics processing unit (GPU) or both), a main memory 1004 and a static memory 1006, which communicate with each other via a bus 1007. The computer system 1000 may further include a video display unit 1010 (e.g., a liquid crystal display (LCD) or a cathode ray tube (CRT)). In example embodiments, the computer system 1000 also includes one or more of an alphanumeric input device 1012 (e.g., a keyboard), a user interface (UI) navigation device or cursor control device 1014 (e.g., a mouse), a disk drive unit 1016, a signal generation device 1018 (e.g., a speaker), and a network interface device 1020. Machine-Readable Medium

The disk drive unit 1016 includes a machine-readable storage medium 1022 on which may be stored one or more sets of

15

instructions **1024** and data structures (e.g., software instructions) embodying or used by any one or more of the methodologies or functions described herein. The instructions **1024** may also reside, completely or at least partially, within the main memory **1004** or within the processor **1002** during execution thereof by the computer system **1000**, with the main memory **1004** and the processor **1002** also constituting machine-readable media.

While the machine-readable storage medium **1022** may be shown in an example embodiment to be a single medium, the term “machine-readable storage medium” may include a single storage medium or multiple storage media (e.g., a centralized or distributed database, or associated caches and servers) that store the one or more instructions. The term “machine-readable storage medium” shall also be taken to include any tangible medium that may be capable of storing, encoding, or carrying instructions for execution by the machine and that cause the machine to perform any one or more of the methodologies of embodiments of the present application, or that may be capable of storing, encoding, or carrying data structures used by or associated with such instructions. The term “machine-readable storage medium” shall accordingly be taken to include, but not be limited to, solid-state memories and optical and magnetic media. Specific examples of machine-readable storage media include non-volatile memory, including by way of example semiconductor memory devices (e.g., Erasable Programmable Read-Only Memory (EPROM), Electrically Erasable Programmable Read-Only Memory (EEPROM), and flash memory devices); magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks.

#### Transmission Medium

The instructions **1024** may further be transmitted or received over a communications network **1026** using a transmission medium via the network interface device **1020** and utilizing any one of a number of well-known transfer protocols (e.g., Hypertext Transfer Protocol (HTTP)). Examples of communication networks include a local area network (LAN), a wide area network (WAN), the Internet, mobile telephone networks, Plain Old Telephone Service (POTS) networks, and wireless data networks (e.g., WiFi and WiMax networks). The term “transmission medium” shall be taken to include any intangible medium that may be capable of storing, encoding, or carrying instructions for execution by the machine, and includes digital or analog communications signals or other intangible medium to facilitate communication of such software.

Although an overview of the inventive subject matter has been described with reference to specific example embodiments, various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of embodiments of the present application. Such embodiments of the inventive subject matter may be referred to herein, individually or collectively, by the term “invention” merely for convenience and without intending to voluntarily limit the scope of this application to any single invention or inventive concept if more than one is, in fact, disclosed.

The embodiments illustrated herein are described in sufficient detail to enable those skilled in the art to practice the teachings disclosed. Other embodiments may be used and derived there from, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. The Detailed Description, therefore, may be not to be taken in a limiting sense, and the scope of

16

various embodiments may be defined only by the appended claims, along with the full range of equivalents to which such claims are entitled.

Moreover, plural instances may be provided for resources, operations, or structures described herein as a single instance. Additionally, boundaries between various resources, operations, modules, engines, and data stores are somewhat arbitrary, and particular operations are illustrated in a context of specific illustrative configurations. Other allocations of functionality are envisioned and may fall within a scope of various embodiments of the present application. In general, structures and functionality presented as separate resources in the example configurations may be implemented as a combined structure or resource. Similarly, structures and functionality presented as a single resource may be implemented as separate resources. These and other variations, modifications, additions, and improvements fall within a scope of embodiments of the present application as represented by the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

**1.** A method for reconciling detailed user transaction feedback with a numerical transaction rating by a user that rates a seller of an item, comprising:

detecting, by one or more computer processors, that the transaction rating indicates a negative experience;

using a positive sentiment mining tool, mining a sentiment of words in the feedback and detecting that the words indicate positive sentiment;

responsive to detecting that the words indicate positive sentiment, preparing confirmatory content to present to the user for confirming that the transaction rating indicates a negative experience;

displaying the confirmatory content to the user on a first user interface via the Internet;

receiving from the user, via the Internet, responsive to displaying the confirmatory content, confirmatory information that confirms that the transaction rating indicates a negative experience;

responsive to receiving the confirmatory information, transforming a state of the transaction rating to a state that reconciles the transaction rating and the positive sentiment;

using the reconciled transaction rating, preparing content that measures trustworthiness of the seller; and

displaying the content that measures trustworthiness of the seller to buyers on a second user interface via the Internet.

**2.** The method of claim **1** wherein the positive mining sentiment tool comprises an application for testing words to detect whether the words indicate positive sentiment or negative sentiment.

**3.** The method of claim **1** wherein the confirmatory content comprises a clarification survey.

**4.** The method of claim **1** wherein transforming the state of the transaction rating comprises determining an average transaction rating of the user for a period of time.

**5.** The method of claim **2** wherein testing words comprises detecting that a word is a negative modifier and, responsive to detecting that a word is a negative modifier, flagging the feedback text as indicating negative sentiment.

**6.** The method of claim **2** further comprising determining a positive sentiment score by totaling positive words and negative words in the feedback.

17

7. A machine-readable hardware storage device having embedded therein a set of instructions which, when executed by a machine, causes execution of the following operations: detecting a numerical rating of a transaction, the numerical rating provided by a user and indicating a negative experience;

using a positive sentiment mining tool, mining a sentiment of words in detailed user feedback text that is included with the numerical rating and detecting that the words indicate positive sentiment,

responsive to detecting that the words indicate positive sentiment, preparing confirmatory content to present to the user for confirming that the numerical rating indicates a negative experience;

displaying the confirmatory content to the user on a first user interface via the Internet;

receiving from the user, via the Internet, responsive to displaying the confirmatory content, confirmatory information that confirms that the numerical rating indicates a negative experience;

responsive to receiving the confirmatory information, transforming a state of the numerical rating to a state that reconciles the numerical rating and the positive sentiment;

using the reconciled numerical rating, preparing content that measures trustworthiness of a seller; and displaying the content that measures trustworthiness of the seller to buyers on a second user interface via the Internet.

8. The machine-readable hardware storage device of claim 7 wherein the positive mining sentiment tool comprises an application for testing words to detect whether the words indicate positive sentiment or negative sentiment.

9. The machine-readable hardware storage device of claim 7 wherein the confirmatory content comprises a clarification survey.

10. The machine-readable hardware storage device of claim 7 wherein adjusting the state of the numerical rating comprises determining an average numerical rating of the user for a period of time.

11. The machine-readable hardware storage device of claim 8 wherein testing words comprises detecting that a word is a negative modifier and, responsive to detecting that a word is a negative modifier, flagging the feedback text as indicating negative sentiment.

12. The machine-readable hardware storage device of claim 8 further comprising determining a positive sentiment score by totaling positive words and negative words in the feedback.

18

13. A system for reconciling detailed user transaction feedback with a numerical transaction rating by a user that rates a seller of an item, comprising:

one or more hardware processors configured to detect that the numerical transaction rating indicates a negative experience;

mine, by use of a positive sentiment mining tool, a sentiment of words in the feedback and detect that the words indicate positive sentiment;

responsive to detecting that the words indicate positive sentiment, prepare confirmatory content to present to the user for confirming that the numerical transaction rating indicates a negative experience;

display the confirmatory content to the user on a first user interface via the Internet;

receive from the user, via the Internet, responsive to displaying the confirmatory content, confirmatory information that confirms that the numerical transaction rating indicates a negative experience;

responsive to receiving the confirmatory information, transform a state of the numerical transaction rating to a state that reconciles the numerical transaction rating and the positive sentiment;

prepare, by use of the reconciled numerical transaction rating, content that measures trustworthiness of the seller; and

display the content that measures trustworthiness of the seller to buyers on a second user interface via the Internet.

14. The system of claim 13 wherein the positive mining sentiment tool comprises an application for testing words to detect whether the words indicate positive sentiment or negative sentiment.

15. The system of claim 13 wherein the confirmatory content comprises a clarification survey.

16. The system of claim 1 wherein transforming the state of the transaction rating comprises determining an average transaction rating of the user for a period of time.

17. The system of claim 14 wherein testing words comprises detecting that a word is a negative modifier and, responsive to detecting that a word is a negative modifier, flagging the feedback text as indicating negative sentiment.

18. The system of claim 14 further comprising determining a positive sentiment score by totaling positive words and negative words in the feedback.

\* \* \* \* \*